

DRAFT

State of California Medical Care and Public Health Surge Plan All-Hazard Response to Disasters



California Emergency Medical Services Authority
California Department of Health Services

California Medical Care and Public Health Surge Plan

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Acronyms

HRSA	Health Resources and Services Administration
NBHP	National Bioterrorism Hospital Preparedness Program
CHSCS	California Healthcare Surge Capacity Survey
CDHS	California Department of Health Services
CHA	California Hospital Association
JAC	Joint Advisory Committee on Public Health Preparedness
EMSA	Emergency Medical Services Authority
EMS	Emergency Medical Services
CDC	Centers for Disease Control and Prevention

I. BACKGROUND

A. Introduction

Attacks from a biological, chemical, or radiological agent, a natural event, or emerging diseases such as severe acute respiratory syndrome (SARS) or pandemic influenza, will impose significant demands on California's healthcare system. During these crises, healthcare systems will have to convert quickly from their current patient capacity to surge capacity, the maximum patient load a healthcare system can handle. Converting to surge capacity is a daunting task. Hospitals and other medical care providers must be prepared to receive and treat large numbers of patients, requiring sufficient staff, ventilators, oxygen, medications, vaccines, personal protective equipment, and other supplies. In addition, the healthcare sector must address the special needs of vulnerable groups such as children, the elderly, and persons with disabilities. Essential hospital services such as food, water, and electricity must be continuously available, and care providers must be able to effectively communicate with public health, emergency medical services and other regional support services.

The purpose of this report is to describe the standards used to assess healthcare surge capacity, determine the degree to which California meets these standards, identify gaps in surge capacity, and propose solutions to meet identified gaps. This paper specifically focuses on California's ability to meet surge demands in the healthcare sector with particular emphasis on hospitals and does not address the need for surge capacity in other aspects of public health, such as laboratory testing capacity.

In determining the standards to measure whether California has adequate surge capacity, CDHS and EMSA considered the following:

- Federal benchmarks established by the National Bioterrorism Hospital Preparedness Program (NBHPP) administered by the Health Resources and Services Association (HRSA),
- Guidance from the Centers for Disease Control and Prevention (CDC),
- Current medical literature, and
- Advice and consultation with the CDHS Joint Advisory Committee on Public Health Preparedness (JAC.)

In addition, CDHS undertook two activities to assess the patient care surge capacity of California's healthcare system. First, CDHS initiated a survey of all patient care capacity across California, using HRSA benchmarks and standard definitions for measuring the benchmarks. Additionally, using a software modeling program developed by CDC (FluSurge 2.0), CDHS assessed the patient care surge capacity needed during a pandemic. These activities are described in Section II of this report.

After consideration of the inputs above, CDHS assessed the surge capacity of California's healthcare system at two levels. The first standard is established by the HRSA NBHPP, reflecting preparedness for a moderate level event. The second standard relates to the medical surge associated with a projected catastrophic or pandemic influenza scenario. The levels of disaster are described in Section I.B. below. Based on these criteria, this report discusses findings at both moderate and catastrophic-pandemic levels.

B. Surge Capacity

The term Surge Capacity is defined by the Agency for Healthcare Research and Quality (AHRQ) as:

"A healthcare system's ability to expand quickly beyond normal services to meet an increased demand for medical care in the event of bioterrorism or other large-scale public health emergencies".

Quantifying surge capacity focuses on items that can be acquired and measured. The AHRQ definition has broadened to include three essential categories of resources: beds, staffing, and supplies and equipment.

Surge Capacity Resources for Hospitals

Beds	Emergency department beds, intensive care unit beds, general acute care beds, mental health beds, pediatric beds
Staffing	Physicians, nurses, pharmacists, mental health professionals, emergency medical technicians, public health professionals and non-professional and support staff
Supplies and Equipment	Pharmaceuticals, personal protective equipment (PPE), portable and fixed decontamination systems, isolation beds, ventilators, masks

However, it is important to note that surge capacity is not simply the accumulation of resources. The absence of surge planning in the face of a disaster could render otherwise important assets ineffective when most needed. The Surge Capacity Model shown in Appendix A identifies preparedness and response activities needed for public health emergencies.

The goal of surge planning is to ensure readiness at the facility, local, regional and State levels. Effective surge planning cannot be a "just in time" event. It requires specific activities, foremost of which is an updated statewide inventory of important surge resources. Facility surge plans should be scalable to the type and magnitude of the incident with appropriate triggers for implementing components of the plan.

Generally, incidents or disasters can be divided into three categories:

Mild – Characterized by local impact, e.g., a single explosive event in a shopping mall. It may result in a multi-casualty incident. It is principally handled within the local area.

Moderate – Characterized by broader impact, e.g., regional earthquake, fire, flood, or bioterrorist attack. This situation would generally result in a mass casualty incident. It extends beyond local area to broader regional involvement.

Catastrophic – Characterized by wide-ranging impact, e.g., Katrina-like event or pandemic influenza. Has statewide impact across regions. Such events may be either *immediate* (immediate impact, majority of casualties in minimal time, severe short-term impact on health system) or *long-term* (gradually increasing impact, exponentially increasing casualties, severe long-term impact on health system).

HRSA benchmarks focus on preparing for moderate regional incidents such as an earthquake, fire, flood or regional terrorist events. HRSA benchmarks are expected to be inadequate for responding to catastrophic events such as pandemic influenza or a Katrina-type hurricane.

Disaster Level Matrix

Severity of Disaster Event	Hazard Examples	Medical and Health Consequences	Resources Necessary
Mild	Multi-Car Collisions Train or Mass Transit Incidents Airplane Crashes Terrorist Attacks (localized)	Multi-Casualty incidents resulting in 5-250 victims	Local
Moderate	Earthquake Tsunami (depending upon site) Fire Flood CBRNE event	Mass Casualty incidents resulting in 250-10,000 victims	Local Regional State
Catastrophic	Immediate: Katrina-like event <ul style="list-style-type: none">➤ Immediate impact➤ Majority of casualties in minimal time➤ Severe short-term impact on	Mass Casualty incidents and/or overwhelming of the healthcare system	Local Regional State National

	healthcare system Long-Term: Pandemic influenza <ul style="list-style-type: none">➤ Gradually increasing impact➤ Exponentially increasing casualties➤ Severe long-term impact on healthcare system		
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Surge plans must fit into the emergency response system. The Standardized Emergency Management System (SEMS) is California's system required for managing response to multi-agency and multi-jurisdictional emergencies. SEMS incorporates the use of Incident Command Structure (ICS), mutual aid agreements, existing discipline-specific mutual aid, the operational area concept, and multi-agency and inter-agency coordination. State response agencies are required to use SEMS and local government agencies must use SEMS to be eligible for State funding of certain response-related costs resulting from a disaster. At the national level, the National Incident Management System (NIMS), adapted from SEMS, provides the response structure.

Mutual aid plans allow for the progressive mobilization of resources to and from emergency response agencies, local governments, operational areas, regions, and the State with the intent to provide requesting agencies with adequate resources. Generally, when local capabilities are exceeded, mutual aid is provided, first from surrounding communities, then from other regions and the State, and finally other states and countries. (See map of OES Mutual Aid Regions on the following page.)

California Regions



C. State, Local Health Department, and Hospital Roles and Responsibilities in Health Care Surge Capacity

State Roles and Responsibilities in Health Care Surge Capacity

The State is responsible for coordinating response to an event that crosses jurisdictions and/or exceeds the capacity of local agencies to respond. CDHS is the lead state agency in responding to bioterrorism and other public health emergencies. CDHS coordinates statewide public health preparedness and response; provides policy direction, technical expertise, and consultation; receives information about health threats 24/7 and directs them to the appropriate program or local health department; and provides direct response when an event exceeds local capacity. CDHS coordinates activities with OES, and with EMSA operates the Joint Emergency Operations Center (JEOC) to coordinate public health response.

CDHS has responsibility to provide standards and guidelines for health care surge to ensure that surge capacity is available in all communities and maximize the effective use of resources to meet the health care needs during emergencies. CDHS has the authority to grant hospitals flexibility in meeting licensing requirements during an emergency. Under the Patient Accommodation regulations, CDHS may grant temporary permission to house patients in space that has not been previously approved for patient care or for some other level of care. In a declared emergency, many legal requirements can be suspended.

CDHS receives funds from HRSA for the NBHPP to enhance the ability of healthcare systems to respond to bioterrorism and other public health emergencies. For the past three years, California has received approximately \$39 million per year from this grant. CDHS must ensure that 75 percent of the direct costs of the grant either go directly to, or directly benefit, hospitals, clinics, emergency medical services (EMS) systems, or poison control centers. CDHS allocates NBHPP funds to the county level, which in turn plans for use of these funds and collects data on progress toward meeting grant benchmarks.

Using the HRSA grant, CDHS has provided 340 of California's 442 general acute care hospitals with surge supplies and equipment including cots, personal protective equipment such as powered air purifying respirators (PAPRs) and N-95 masks, generators, medical supplies, pharmaceutical caches, communications equipment, and isolation capacity systems.

EMSA is charged with providing leadership in developing and implementing EMS systems throughout California and setting standards for the training and scope of practice of various EMS personnel. As the lead agency responsible for coordinating California's medical response to disasters, EMSA provides medical resources to local governments in support of their disaster response.

Local Health Department Roles and Responsibilities in Health Care Surge Capacity

Under SEMS, local entities are the first responders in an emergency. California's local health departments are the point of delivery of public health services and in emergencies provide response within their capability. Under the HRSA program, local health departments or an alternate county agency leads a planning process to measure available surge capacity and develop a spending plan for its HRSA funds, based on planning undertaken with hospitals in the community. CDHS approves each county's spending plans for their HRSA funds and collects data on their progress toward meeting grant benchmarks.

In a catastrophic event such as pandemic influenza, hospital surge capacity will be overwhelmed. Additional surge capacity will be needed at alternate care sites in every community to meet surge demand. Planning for and ensuring the availability of these alternate care sites is the responsibility of the local health department, in consultation with local hospitals. The Governor's January Budget for fiscal year 2006-07 recognized the large role of local health departments and requested \$16 million to support local preparedness for pandemic influenza, including coordination of alternate care sites.

Hospital Roles and Responsibilities in Health Care Surge Capacity

Hospital capacity and preparedness are essential components of the state's ability to effectively respond to disasters. California's acute care hospitals have ably responded to many disasters, meeting the need for health care surge in earthquakes, floods, and fires. However, responding to a major bioterrorism event, confronting a catastrophic event, or managing emergencies occurring simultaneously in different regions of the State would increase the stress on the ability of California's hospitals to respond.

The Joint Commission for the Accreditation of Health Organizations (JCAHO) requires accredited hospitals to have emergency plans in place. These requirements focus on ensuring that patients within a hospital are protected during an emergency such as a flood, fire, or power outage. Current hospital regulations related to disasters and mass casualties primarily address keeping patients and staff safe, evacuating patients, and accepting patients who present at the emergency department.

Although current regulations require hospitals to develop disaster and mass casualty plans, there is no requirement that those plans be coordinated or consistent with the disaster plans of local health departments. Nor are hospitals currently required to participate in local emergency preparedness or surge drills.

According to the Office of Statewide Health Planning and Development, in 2004, California had 86,023 acute care licensed beds, of which 72,592 were staffed. Of the staffed beds, 5,646 were at the intensive care level.

Unlike most other emergency response systems such as police, fire, and paramedics, the hospital system is largely private. In California, 84 percent of hospitals are private entities.

D. Discussion of HRSA Benchmarks and CDC Pandemic Influenza Modeling

1. Under the HRSA NBHPP, the primary benchmark to prepare for medical surge is the ability to provide staffed healthcare beds for 500 patients per 1 million population, above daily utilization, within 3 hours of an event. In addition to requiring data on surge capacity within 3 hours, HRSA also requires data on surge capacity within 24 hours.

Using the California Department of Finance 2005 population estimate of 36,810,358, these benchmarks translate to the ability of healthcare facilities to accept **18,405** patients within 3 hours.

This population-based surge capacity target serves as the basis for other HRSA requirements; for example, in addition to beds, surge requires adequate staffing, equipment, and supplies to care for surge patients. HRSA surge requirements specifically address four classes of patients: 1) acute infectious disease, 2) chemical poisoning and botulinum, 3) trauma and burn, and 4) radiation-induced illness. This target is also the basis for determining the ability of emergency medical services to transport patients to healthcare facilities.

In order to gauge California's readiness to handle medical surge, CDHS undertook the development of the first statewide assessment survey of hospitals, clinics, local EMS agencies, and local health departments. The California Healthcare Surge Capacity Survey (CHSCS) was designed to measure the level of preparedness related to each of the HRSA benchmarks as the basis for identifying existing gaps. Furthermore, the CHSCS collected additional data that extended beyond the HRSA benchmarks to assist in evaluating other important preparedness capabilities, including factors related to preparedness for pandemic influenza. A description of the CHSCS and HRSA benchmarks are discussed in Section II of this report. (See Appendix B for Summary of HRSA Critical Benchmarks)

2. Under expected patient surge associated with pandemic influenza, the primary assumptions are that 25% of the population will become ill, 4.4% of those who become ill will be admitted to the hospital, 15% of those admitted will require ICU care and 7.5% will require ventilator care. California may require the ability to treat **58,723 patients** above existing daily staffed bed capacity, with the majority requiring intensive care (39,699 in ICU) and ventilators (34,028 ventilators). These projections were derived using FluSurge 2.0 software developed by CDC and assuming a pandemic midway between the mild 1968 influenza pandemic and the severe 1918 influenza pandemic. FluSurge provides estimates of the total number of staffed general medical-surgical beds, critical care beds (including both ICU beds as well as monitored beds), and ventilators needed during an influenza pandemic.

(*ICU beds* are advanced care beds meeting specific licensing requirements; *monitored beds* are defined as beds having a high degree of patient care capability due in part to more sophisticated monitoring than general medical-surgical beds.)

While medical surge would exist throughout the pandemic, the greatest need for surge capacity is expected to occur in 2-3 waves of 6-8 weeks over an 18-24 month period. The highest demand is projected to occur in week 5 of the first cycle.

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II. FINDINGS FROM THE CALIFORNIA HEALTHCARE SURGE CAPACITY SURVEY AND PANDEMIC INFLUENZA MODELING

A. Development of the Survey Instrument

In February 2006, CDHS undertook a major statewide project to assess healthcare surge capacity among participants in the HRSA National Bioterrorism Hospital Preparedness Program. This project was initiated because analysis of previously collected healthcare surge capacity data showed inconsistencies across counties in assumptions and definitions. The goal of the project was to determine whether California met benchmarks for patient surge capacity set by HRSA and to identify other gaps in California's ability to meet surge demands during an emergency including a catastrophic-pandemic event.

CDHS convened a Surge Capacity Data Workgroup to develop standardized data definitions, common assumptions, and preferred methods of data collection and reporting. The workgroup included a wide variety of stakeholders, including representatives of the CDHS Emergency Preparedness Office, California Hospital Association, California Primary Clinic Association, EMSA, Department of Mental Health, CDHS Maternal and Child Health Branch, Office of Statewide Health Planning and Development, CDHS Licensing and Certification Division, healthcare facilities, local emergency medical services agencies, and local health departments. In addition to the full workgroup, sub-workgroups focused on each of the NBHPP benchmarks and other critical preparedness and response needs. Over 20 meetings were held to develop survey instruments for hospitals, clinics, local emergency medical services agencies, and local health departments. This report focuses on the data reported by hospitals.

The CHSCS focused on the data elements needed to measure preparedness relative to HRSA benchmarks, as well as additional data elements the workgroup determined necessary for responding to an emergency. While the majority of HRSA benchmarks provide clear and unambiguous metrics for quantifying a state's level of preparedness, certain benchmarks are less specific, leaving states to determine appropriate measurement of the benchmark. An example is HRSA Benchmark 5 which states that hospital personnel shall receive "competency-based education and training", without defining what training, who needs to be trained, and how often. The Surge Capacity Data Workgroup developed specific quantitative measures for all HRSA benchmarks that were not specific.

In order to undertake statewide planning using common data, the CHSCS asked hospitals to adhere to a series of standardized assumptions and definitions based on the premise that emergency conditions exist and hospitals are not operating "as usual": In addition to the general benchmarks for acute medical-surgical care, the survey focused on four scenarios listed in the HRSA application guidance: acute infectious

disease, chemical poisoning and botulinum, trauma and burn, and radiation-induced injured. Key assumptions as agreed to by the workgroup were:

- Assume an emergency proclamation is in place and that licensing and regulatory requirements have been modified under the proclamation.
- Austere nurse-to-patient staffing ratio of 1:5 for Critical Care or Monitored Beds and 1:20 for Other Medical-Surgical Beds.
- Measure resources only under hospital control.
- Do not expect mutual aid from outside the facility for at least 72 hours.
- Reported surge capacity must be that which exists above average daily occupancy (census). (For the purposes of this survey, “average daily occupancy (census)” should be computed as the average daily number of occupied beds over the preceding 12-month period).
- Report for inpatient care areas only.
- Report for two classes of surge beds:
 - Critical Care/Monitored Beds
 - General Medical-Surgical Beds (Unmonitored)
- Assume need to self-sustain care within the facility for a minimum of 72 hours without re-supply of equipment, supplies and staff.
- Assume 30% of staff will not report to work due to inability to get there, illness, or safety concerns.

A complete list of the survey assumptions is shown in Appendix C.

CDHS issued the surveys to the 47 county HRSA entities that serve California's 58 counties (including two consortia which serve 13 counties) that in turn distributed the appropriate surveys to participating hospitals, clinics, EMS agencies, and local health departments within their area. A tool for calculating surge capacity was provided along with the survey to incorporate beds, staff, and supplies and equipment into these calculations. Following the survey release, CDHS conducted training for local entities and survey recipients in each of the State's six OES Mutual Aid Regions, and additional training teleconferences were held throughout the reporting process. Although Los Angeles (LA) County receives a separate NBHPP grant from HRSA, LA County elected to participate in the statewide survey process administered by CDHS

As of October 16, 2006, 327 hospitals, 217 clinics, 71 EMS agencies, and 55 local health departments had responded to the survey. (See Appendix D for the hospital survey instrument.) CDHS is working on a report of findings for the clinics and local health departments.

B. Participation in the Survey

Of the 442 general acute care hospitals licensed in California, 340 participate in the HRSA NBHPP Program. As of October 16, 2006, three hundred twenty-seven hospitals (96% of participating hospitals) returned their CHSCS. Of the 13 NBHPP participating hospitals that did not respond, 8 have less than 100 licensed beds. The

returned surveys represent more than 96% of the licensed hospital beds located in participating hospitals and more than 73% of all licensed hospital beds in the state. The CHA requested non-participating hospitals also participate in the survey. A small number of these hospitals returned their surveys which indicated little capacity for patient care surge.

C. Detailed Survey Findings – HRSA Benchmarks

This report reflects survey responses received from hospitals as of October 16, 2006. Survey findings are presented by HRSA benchmark and divided into the following categories: 1) Beds, 2) Staffing, 3) Supplies and Equipment, 4) Patient Triage and Transport, 5) Lab Connectivity and Surveillance, and 6) Training and Exercises. Benchmark standards are those appearing in HRSA's 2005-06 Guidance (see Appendix C). It is important to note that HRSA modifies its benchmarks each year and has eliminated benchmarks in FY2006, instead using performance measures. Nevertheless, the HRSA benchmarks are the most comprehensive criteria available for measuring healthcare surge capacity. Data were analyzed by counties and the six OES Mutual Aid Regions.

1) Beds

Benchmark 2-1: Surge Beds

The HRSA benchmark that serves as the basis for all other benchmarks is Benchmark 2-1: Surge Beds. Calculated at 1 bed per 2000 population, the overall staffed surge bed goal for California is 18,405, based on January 2005 California Department of Finance projections. This benchmark requires measurement of patient care capacity, taking into consideration staffing, supplies and equipment needed to care for a patient in addition to surge beds.

HRSA Benchmark 2-1	Metric
Surge Beds	<p>Establish systems that, at a minimum, can provide triage, treatment and initial stabilization, above current daily staffed bed capacity, for the following classes of adult and pediatric patients requiring hospitalization within three hours in the wake of a terrorism incident or other public health emergency:</p> <ul style="list-style-type: none">a. 500 cases per million (1:2000) population for patients with symptoms of acute infectious disease – especially smallpox, anthrax, plague, tularemia and influenza;b. 50 cases per million population for patients with symptoms of acute botulinum intoxication or other acute chemical poisoning – especially that resulting from nerve agent exposure;c. 50 cases per million population for patients suffering

	<p>burn or trauma; and</p> <p>d. 50 cases per million population for patients manifesting the symptoms of radiation-induced injury – especially bone marrow suppression.</p>
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Based on the information collected to date and using the assumptions established by the Surge Capacity Data Workgroup, California currently does not meet Benchmark 2-1 statewide. Benchmark 2-1 requires that California have the ability to surge 18,405 staffed beds within 3 hours of the public health emergency. Although earlier self-reporting by hospitals indicated that California had reached this surge goal, when hospitals were asked to use the CHSCS definitions and assumptions, the number of surge beds decreased considerably. The CHSCS data show that California is currently able to surge 14,070 beds within 3 hours, 4,335 beds below the benchmark. In reviewing county-specific data, 34 counties fail to meet the benchmark within 3 hours. When viewed by OES mutual aid region, only Region III, representing the small counties in Northern California, meets this benchmark within 3 hours. (See Appendix E for a summary by county.)

At 24 hours, the number of surge beds available increases to 19,940 or 1,535 staffed beds over the benchmark and the number of counties unable to meet their individual surge targets at 24 hours drops to 23. When viewed by mutual aid region, only Region I, which include most of southern California, fails to meet this benchmark.

Benchmark 2-1 for acute infectious disease requires surge beds for both adult and pediatric care. HRSA benchmarks do not indicate what portion of the surge beds should be available for pediatric care. Given the absence of a metric for pediatric beds, CDHS, in consultation with JAC, correlated the proportion of children age 0-13 in the overall state population to the target for pediatric surge beds. According to the Department of Finance 2005 population data, children aged 0-13 represent 20% of California's population. Based on this model, California would need 3,681 pediatric surge beds. Survey data indicate that only 1,583 pediatric surge beds are available in 3 hours and 2,208 in 24 hours.

Benchmark 2-1 also requires California to surge to 1,841 beds for each of the following scenarios: chemical poisoning and botulinum, trauma and burn, and radiation-induced injury. For purposes of the survey, given the differing medical treatment for chemical poisoning and botulinum, hospitals were asked to focus on chemical poisoning in responding to this category.

HRSA does not address the level of care required for patients under these scenarios. Given that the surge requirement is reduced from 1 per 2000 population to 1 per 20,000 population, CDHS, in consultation with JAC, applied the HRSA benchmark to patients requiring critical care under each of these scenarios. If both critical care and general medical-surgical beds are examined, available surge beds are well above the HRSA benchmark requirements. The following chart displays each of these scenarios by

region, including only critical care surge beds available within 3 hours of the incident.

	<i>HRSA Benchmark Required Within 3 Hours</i>	<i>Chemical Poisoning</i>	<i>Trauma and Burn</i>	<i>Radiation- Induced Injury</i>
Region I	739	744	648	564
Region II	408	833	526	420
Region III	39	56	66	82
Region IV	172	269	225	195
Region V	130	177	127	111
Region VI	353	476	408	426
TOTAL	1,841	2,555	2,000	1,798

Neither Region I nor V meet the HRSA Benchmark at the 3 hour mark for Trauma and Burn and Radiation-Induced Injury. However, statewide, California meets the staffed bed requirements for chemical poisoning and trauma and burn. Statewide, California is short 43 critical care surge beds for a radiation-induced injury scenario.

In addition to asking the number of surge beds available, CHSCS included questions related to surge planning. Survey questions asked if hospitals had documented surge plans, if the plans were scalable to the size of the incident, and whether the hospital had mutual aid agreements with other hospitals in place. An operational hospital surge plan would require each of these elements to be in place. Of the 327 reporting hospitals, only 160 (49%) indicated they had documented, scalable surge plans that included appropriate triggers for activation of the plan; and 133 (41%) indicated that their plans included agreements with other hospitals. CDHS has examined a number of the documented surge plans, finding that even the documented plans need additional work to make them operational.

Benchmark 2-2: Isolation Capacity

HRSA Benchmark 2-2	Metric
Isolation Capacity	Ensure that all participating hospitals have the capacity to maintain, in negative pressure isolation, at least one suspected case of a highly infectious disease (e.g., smallpox, pneumonic plague, SARS, influenza and hemorrhagic fevers) or febrile patient with a suspect rash or other symptoms of concern who might be developing a highly communicable disease. Awardees must identify at least one regional healthcare facility, in each awardee defined region, that is able to support the initial evaluation and treatment of at least 10 adult and pediatric patients at a time in negative pressure isolation within 3 hours post-event.

Under Benchmark 2-2: Isolation Capacity, HRSA requires that each hospital have the ability to maintain one patient in negative pressure isolation and that each region identify at least one facility with the capacity to isolate 10 adult and pediatric patients. California meets Benchmark 2-2 as all California hospitals reported the ability to isolate at least one patient, and all regions were identified at least one facility with the ability to isolate 10 patients as required.

2) Staffing

Benchmark 2-4: Emergency System for the Advanced Registration of Voluntary Health Professionals

Benchmark 2-4	Metric
Staffing	Develop a system that allows for the advance registration and credentialing of clinicians needed to augment a hospital or other medical facility to meet patient/victim care and increased surge capacity needs.

The Emergency System for the Advanced Registration of Volunteer Health Professionals (ESAR-VHP) is intended to identify surge personnel who can be called upon in the event of a disaster. The system will pre-register and pre-credential healthcare personnel who volunteer prior to a disaster and will “call up” and deploy them when the need arises. The pilot phase of the ESAR-VHP project began on February 28, 2006 and ended on August 31, 2006. During the pilot phase, ESAR-VHP requested volunteers who were personally invited to register and provide feedback used to refine pilot software. Broad recruitment for the pilot registry will begin shortly with physicians, pharmacists, registered nurses, and paramedics. EMSA plans to begin implementation of the ESAR-VHP Registry with up to 5000 volunteers by September 1, 2006.

The CHSCS included a number of questions related to incorporating volunteers into existing hospital staff. Specifically, the CHSCS asked if hospitals had a system in place to manage professional and allied health healthcare volunteers and if the facility had a plan to manage non-healthcare volunteers. Two hundred forty-three (243) of the 327 hospitals (74%) that returned a survey reported having a system for managing professional and allied health healthcare volunteers and 209 of the 327 reporting hospitals (64%) had systems in place for managing non-healthcare volunteers.

3) Supplies And Equipment

Benchmark 2-5: Pharmaceutical Caches

Benchmark 2-5	Metric
Pharmaceutical Caches	Establish a regional system that insures a sufficient supply of pharmaceuticals to provide prophylaxis for 3 days to hospital personnel (medical and ancillary staff), hospital based emergency first responders, and their families -- in the wake of a terrorist-induced outbreak of anthrax or other disease for which such countermeasures are appropriate.

To ensure that healthcare workers are protected and able to continue to provide care, HRSA requires that each state have a sufficient supply of pharmaceuticals for prophylaxis of hospital personnel (medical and ancillary staff), hospital based first responders, and their families. HRSA does not specify which pharmaceuticals should be purchased or how to calculate the number of family members. The Surge Capacity Data Workgroup recommended using a standard of 4 household members per healthcare worker (the healthcare worker plus three household members). In the CHSCS, participating hospitals reported a total of 492,770 staff, which brings the required number of 3-day prophylactic courses to 1,971,080.

Hospitals reported the following number of prophylactic courses: amoxicillin (89,147), doxycycline (156,481), ciprofloxacin (131,587) and levofloxacin (34,465). The table below shows the number of 3-day courses available for each pharmaceutical by region.

	Number of Staff Reported	Amoxicillin	Doxycycline	Ciprofloxacin	Levofloxacin
Region I	184,041	9,938	85,834	6,207	14,966
Region II	136,913	48,282	19,571	79,034	6,679
Region III	10,880	3,976	4,175	12,401	1,468
Region IV	50,230	15,345	34,205	26,568	6,005
Region V	30,322	1,825	4,302	891	1,625
Region VI	80,384	9,781	8,394	6,486	3,722
TOTAL	492,770	89,147	156,481	131,587	34,465

Benchmark 2-6: Personal Protective Equipment (PPE)

HRSA Benchmark 2-6	Metric
PPE	Each awardee must ensure PPE per awardee defined region, to protect current and additional healthcare personnel, during an incident. This benchmark is tied directly to the number of

	<p>healthcare personnel the awardee must provide to support surge capacity for beds.</p> <p>In Year 3, HRSA required that each hospital have a minimum of 10 Powered Air Purifying Respirators (PAPRs).</p>
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HRSA does not define “adequate PPE”, stating only that the number of staff requiring PPE should be tied to the number of healthcare workers needed to support the surge capacity for beds.

The 327 hospitals reported a statewide total of 6,234 PAPRs. The statewide average is 19 PAPRs per hospital, and every region reports more than 10 PAPRs per hospital on average. However, when examined by county, Mendocino, Butte, Lassen, Shasta, Kings, Merced, and Mono Counties did not average 10 PAPRs per hospital.

In addition to measuring the number of PAPRs, the CHSCS includes questions on the number of staff requiring PPE, the number of complete suits (or persons who could be fully equipped) for the various levels of PPE, and the number of staff trained for the use of each level of PPE. Survey data show that there are 281 Level A, 428 Level B, 7,972 Level C, and 136,822 Level D PPE available. Hospitals report that 237,018 staff members would require some level of PPE. Survey questions were not specific as to what level of protection staff would need. The highest levels of protection, Levels A and B, are primarily used by HAZMAT teams. Normal hospital procedures may require Level C (PAPRs) or Level D protection (universal precautions such as surgical or N-95 masks). Only 7,434 hospital staff received training in the use of Level C equipment (which includes PAPRs), or roughly .93 staff persons per existing PAPER.

PPE	Level A	Level B	Level C	Level D
Existing Supply	281	428	7,972	136,822
Number of Staff Trained	520	1,218	7,434	Not measured

Given national attention on the availability of N95 masks and ventilators, the CHSCS included questions to measure the current availability of each. Hospitals reported a total of 5,615 traditional ventilators and 5,076 transport ventilators. Hospitals indicated that on average throughout the year, 3,063 or 55% of traditional ventilators are in use. The number of ventilators in use rises dramatically during normal flu season.

Hospitals reported availability of 526,416 N-95 masks. The chart below shows the percentage of California’s population in each mutual aid region and the percentage of the currently available masks available in each region.

	<i>Population As of 1/1/2005</i>	<i>% Population</i>	<i>Number of N-95 Masks</i>	<i>% of Masks Reported</i>
Region I	14,776,410	40.14%	197,640	38%
Region II	8,152,972	22.15%	109,037	21%
Region III	786,583	2.14%	6,590	1%
Region IV	3,435,586	9.33%	127,345	24%
Region V	2,590,370	7.04%	11,344	2%
Region VI	7,068,437	19.20%	74,460	14%
TOTAL	36,810,358	100.00%	526,416	100.00%

Benchmark 2-7: Decontamination

<i>HRSA Benchmark 2-7</i>	<i>Metric</i>
Decontamination	Insure that adequate portable or fixed decontamination systems exist for managing adult & pediatric patients as well as healthcare personnel, who have been exposed during a chemical, biological, radiological, or explosive incident in accordance with the numbers associated with Critical Benchmark # 2-1 (Surge Bed Capacity).

HRSA requires that each state ensure that adequate decontamination systems are available for decontamination needs associated with surge bed capacity targets. The CHSCS asked hospitals to report the number of patients, both ambulatory and non-ambulatory, that could be decontaminated within one hour. To determine the number of patients that could be decontaminated within three hours, the one hour number was multiplied by three. It is unknown whether this overstates decontamination capacity at the three hour mark as it assumes a constant rate per hour. However, based on this calculation, the following chart indicates that all regions meet the need for decontamination equipment. However, only 7,434 staff statewide have received training in Level C PPE. The survey did not ask the number of staff who have received training in the setup and conduction of decontamination.

	<i>Population As of 1/1/2005</i>	<i>Surge Bed BM</i>	<i>Decon Ability within 1 Hour</i>	<i>Decon Ability within 3 Hours*</i>
Region I	14,776,410	7,388	5,912	17,736
Region II	8,152,972	4,076	2,716	8,148
Region III	786,583	393	518	1,554
Region IV	3,435,586	1,718	1,385	4,155
Region V	2,590,370	1,295	477	1,431
Region VI	7,068,437	3,534	1,830	5,490
TOTAL	36,810,358	18,405	12,838	38,514

Benchmark 2-10: IT and Communications

HRSA Benchmark 2-10	Metric
Information Technology and Communications	Establish a secure and redundant communications system that insures connectivity during a terrorist incident or other public health emergency between healthcare facilities and state and local health departments, emergency medical services, emergency management agencies, public safety agencies, neighboring jurisdictions and federal public health officials.

The CHSCS included a matrix asking hospitals to show which methods of communication they had available and how they were most likely to contact various partners, ranging from local health departments to fire, emergency services, and law enforcement. All hospitals surveyed had redundant communication systems. However, only a small percentage reported having any type of priority service for land lines or wireless phones. The following chart shows the reporting hospitals and the partners they communicate with via the listed technologies:

Statewide 327 Reporting Hospitals							
Communication Technology	Public Health	City EOC	EMS	Law Enforcement	County EOC	Fire	Clinics
Phones	275	262	276	273	276	273	268
*GETS/WPS Cards	55	48	70	55	59	57	42
Fax	268	245	260	253	255	254	249
HAM radio	156	154	167	143	176	145	115
Satellite phones	57	51	58	53	56	54	49
Email	267	234	255	244	245	241	236
800 MHz radios	77	74	111	77	91	93	67
Fiber optics	20	17	18	18	18	19	20
Microwave radio	12	10	16	10	15	11	9
Health Alert Network	58	19	28	19	30	19	18

4) Patient Triage And Transport

Benchmark 3: Emergency Medical Services

HRSA Benchmark 3	Metric
Emergency Medical Services	Enhance the statewide mutual aid plan to deploy EMS units in jurisdictions/regions they do not normally cover, in response to a mass casualty incident due to terrorism. This plan must ensure the capability of providing EMS triage, transportation and patient

	tracking for at least 500 adult and pediatric patients per million population within 3 hours post-event.
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Although the local emergency services agency (LEMSA) surveys were not tabulated as of the date of this report, EMSA used currently available information to address this benchmark.

Currently, only two of California's six mutual aid regions have agreements for deploying EMS units and other medical/health resources in jurisdictions/regions they do not normally cover. A Southern California Cooperative Assistance Agreement among the eleven counties in Regions I and VI provides for brokering and sharing of resources by the Regional Disaster Medical/Health Specialists.

Currently in California there are 3,586 ambulances that are physically available to transport patients. Of those, approximately 2,150 are staffed on a daily basis as measured at 12 noon on an average day. Seventy four percent of these ambulances are privately owned and operated. It is estimated that during a disaster, on the average, each ambulance would be able to transport two patients each hour. This assumes that there would be a normal mix of patient acuity levels. Under this planning scenario, using existing ground ambulances, up to 16,770 patients could be transported within 3 hours. This is based on the immediate availability of 2,150 ambulances during the first hour, 2,795 ambulances (30% surge) during the second hour, and 3,440 ambulances (60% surge) during the third hour. Once an ambulance drops off a patient, the vehicle is immediately available for service, unlike a hospital where patients occupy beds for a period of time.

Additional transport capacity will come from air ambulance and rescue helicopters which can be used in a disaster to quickly transport critically ill and injured patients to other facilities which are equipped and able to receive them outside the affected disaster region. Air transport will be vital if ground transport is not possible, whether because patients are in difficult-to-reach places or because the roads are impassable. In addition, transporting some patients to remote locations may help to ease the surge at nearby facilities.

Current California air transportation assets consist of the following:

- 45 air ambulances (40 helicopters and 5 fixed wing aircraft)
- 12 ALS air rescue helicopters
- 5 auxiliary rescue aircraft (3 helicopters and two fixed wing)

Currently, 58 (94%) of all air resources are staffed on a daily basis as measured at 12 noon on an average day. All but 5 of the air ambulances are privately owned and operated while all 5 of the rescue and auxiliary rescue aircraft are operated by state or local public safety agencies. Given these air transport resources, California could

transport roughly 130 critically injured patients within 3 hours, assuming 2 patients per air ambulance.

5) Lab Connectivity And Surveillance

Benchmark 4-1: Lab Connectivity

HRSA Benchmark 4-1	Metric
Lab Connectivity	<p>Implement a hospital laboratory program that is coordinated with currently funded CDC laboratory capacity efforts, and which provides rapid and effective hospital laboratory services in response to terrorism and other public health emergencies.</p> <ol style="list-style-type: none">1. Participating hospital labs will have protocols for rapid referral of clinical samples and associated information to labs in the Laboratory Response Network (LRN).2. Participating hospital lab personnel will demonstrate competency in determining what situations warrant the initiation of these protocols as well as competency in following the protocols.

The CHSCS asked hospitals how many of their laboratory personnel have attended training in the handling and packaging of specimens. Statewide, 621 personnel have received training which includes dry workshops, wet workshops, and web-based training. The survey did not specifically ask hospitals to report the current number of laboratory personnel.

Benchmark 4-2: Surveillance

Benchmark 4-2	Metric
Surveillance	<p>Enhance the capability of rural and urban hospitals, clinics, emergency medical services systems and poison control centers to report syndromic and diagnostic data that is suggestive of terrorism or other highly infectious disease to their associated local and state health departments on a 24-hour-a-day, 7-day-a-week basis.</p>

All hospitals indicated the ability to report data to their local health department via telephone on a 24/7 basis. Most hospitals also indicated the ability to report to local health departments via fax and email.

6) Training Drills And Exercises

Benchmark 2-8: Behavioral Health

HRSA Benchmark 2-8	Metric
Behavioral Health	Enhance the networking capacity and training of healthcare professionals to be able to recognize, treat and coordinate care related to the behavioral health consequences of bioterrorism or other public health emergencies. Training should be competency-based.

In Benchmark 2-8, HRSA does not indicate the number of professionals that must be trained. The CHSCS included two general questions related to behavioral health training: how many behavioral health professionals received competency-based training in behavioral health consequences associated with bioterrorism or other public health emergencies and how many non-behavioral health professionals received such training. Hospitals reported that 2,506 behavioral health professionals and 6,094 non behavioral health professionals have received training in this area.

Benchmark 5: Education and Preparedness Training

HRSA Benchmark 5	Metric
Education and Preparedness Training	Awardees will utilize competency-based education and training programs for adult and pediatric pre-hospital, hospital, and outpatient healthcare personnel responding to a terrorist incident or other public health emergency.

HRSA Benchmark 5 is not specific on the types of training needed for hospital preparedness, indicating only that training must be provided for specific pre-hospital, hospital and outpatient healthcare personnel. The CHSCS specifically asked how many healthcare personnel have been trained in any of the following: Incident Command System (ICS), Hospital Incident Command System (HICS), SEMS/NIMS, PPE, Decontamination, Recognition and/or Treatment of BT related injuries. Of the 492,770 hospital personnel reported, only 91,635 or 18.6% of staff have received training in any of these areas.

Benchmark 6: Exercises

HRSA Benchmark 6	Metric
Exercises	As part of the state or jurisdiction's bioterrorism hospital preparedness plan, functional exercises will be conducted and should be based on the Awardee Hazards and Vulnerability Analysis (HVA). These drills should involve several state agencies and implement the Incident Command Structure (ICS). To the extent possible, members of the public should be invited to participate. These exercises/drills should encompass, if possible, at least one biological agent. The inclusion of scenarios involving radiological and chemical agents as well as explosives may be included as part of the exercises/drills. other public health emergencies.

Under Benchmark 6, HRSA requires hospitals to participate in functional exercises that at a minimum include multiple agencies and implement ICS. As required by HRSA, the CHSCS requested information on exercises conducted from September 1, 2005 through February 28, 2006. Based on this six month time frame, the CHSCS asked hospitals to report the number of exercises including various scenarios such as anthrax, botulinum, plague, smallpox, tularemia, blood agents, blister agents, radiation/nuclear, influenza, explosives, and evacuation. The number of hospitals participating in exercises involving these scenarios ranged from a low of 12 involving tularemia and blood agents to a high of 312 involving an explosive device. The 2005 statewide Golden Guardian Exercise, involving many California hospitals, included an improvised explosive device. Two hundred and two (202) hospitals (approximately 62%) reported participation in evacuation exercises — likely related to Joint Commission on Accreditation of Healthcare Organizations (JCAHO) requirements for exercises demonstrating the movement of patients. CHSCS responses indicated little participation from tribal entities, Homeland Security, FBI, FEMA, CDC, or the National Guard.

D. Detailed Survey Findings : Catastrophic Pandemic Influenza

FluSurge Modeling

The FluSurge modeling assumed the following projections:

- An 8-week attack duration
- A 25% attack rate (25% of population affected)
- A 4.4% admission rate for affected persons to hospitals
- A 26.6% mortality rate for patients admitted to hospitals
- 35% of patients are assumed to be admitted to critical care beds (ICU or monitored beds)
- 30% of patients are assumed to need ventilators

- California Department of Finance (DOF) population estimates for 2006 were used for age-group inputs

FluSurge uses the following **default** assumptions (which can be altered by the user).

1. Average length of non-ICU hospital stay for influenza-related illness is 5 days.
2. Average length of ICU stay for influenza-related illness is 10 days.
3. Average length of ventilator usage for influenza-related illness is 10 days.
4. Average proportion of admitted influenza patients will need ICU care is 15%.
5. Average proportion of admitted influenza patients will need ventilators is 7.5%.
6. Average proportion of influenza deaths assumed to be hospitalized is 70%.
7. Daily percentage increase in cases arriving compared to previous day is 3%.

FluSurge Results for California and Assumptions Used

FluSurge 2.0 was used to calculate the estimated staffed bed capacity needed, ICU capacity needed, ventilator usage, and deaths from an influenza pandemic, assuming an 8 week pandemic wave with a 25% attack rate. The following default assumptions and input values were changed as explained below.

- Assumption 4 (The average proportion of admitted influenza patients who will need ICU care) was increased from 15% to **35%**. This was done because the projected rate of in-hospital mortality (26.6%) would require that at least 35% of hospitalized patients be treated in an ICU.
- Assumption 5 (The average proportion of admitted influenza patients who need ventilators) was increased from 7.5% to **30%**. As with Assumption 5, this was done because the projected rate of in-hospital mortality (26.6%) would require that at least 30% of hospitalized patients be treated with a ventilator.
- FluSurge uses age and risk-factor specific rates for hospitalization and deaths based on a mild 1968-type pandemic. In order to estimate the impact of a future pandemic of mid-level to severe impact, the age and risk-factor specific rates for hospitalization and deaths from the 1968 and 1918 pandemics were averaged and the resulting estimates were used as inputs into the FluSurge Model. However, it is not possible at this time to estimate the severity of an avian influenza pandemic, which could be even greater than the 1918 pandemic.
- Estimates of hospital surge capacity in California were used as inputs:
 - Total number Staffed non-ICU surge beds: **19,940**
 - Total number Staffed ICU surge beds (includes monitored): **3,507**
 - Total number of surge ventilators (includes transport) available: **10,677**

Estimated Hospital Capacity for an 8 Week Pandemic with a 25% Attack Rate

Pandemic Influenza Impact / Weeks		1	2	3	4	5	6	7	8	9	10
Hospital Admission	Weekly admissions	24,364	40,607	60,910	77,152	77,152	60,910	40,607	24,364		
	Peak admissions/day				12,023	12,023					
Hospital Capacity	# of influenza patients in hospital	17,909	29,849	44,773	56,713	58,723	51,616	39,584	25,967		
	% of hospital surge capacity needed	127%	212%	319%	404%	418%	367%	282%	185%		
ICU/Monitored Capacity	# of influenza patients in ICU	8,527	18,084	27,771	36,682	39,699	38,619	30,687	21,189		
	% of surge capacity needed	260%	552%	848%	1120%	1212%	1179%	937%	647%		
Ventilator Capacity	# of influenza patients on ventilators	7,309	15,500	23,804	31,442	34,028	33,102	26,303	18,162		
	% usage of ventilator	102%	216%	331%	438%	474%	461%	366%	253%		
Deaths	# of deaths from influenza			6,493	10,821	16,232	20,560	20,560	16,232	10,821	6,493
	# of influenza deaths in hospital			4,545	7,575	11,362	14,392	14,392	11,362	7,575	4,545

The FluSurge model projected that for a mid-level pandemic influenza, California needs **58,723** surge beds statewide. Much of this surge capacity would be at the intensive care level, requiring **39,699 intensive care beds** and **34,028 ventilators**.

- California hospitals identify 19,940 surge beds available within 24 hours, comprising 3,507 intensive care beds and 16,433 general medical-surgical beds. Thus, in a pandemic, hospitals currently could provide only 34% of the surge beds needed within 24 hours, including only 8.8% of the intensive care beds needed.
- During a pandemic, California would need 38,783 surge beds in addition to the surge beds available within 24 hours as reported in the CHSCS, including 36,192 intensive care beds and 2,591 general medical-surgical beds. The need for intensive care beds is much greater in an influenza pandemic than in other types of disasters such as an earthquake because influenza is a respiratory disease for which a significant portion of hospitalized patients require ventilators and intensive care.

California hospitals lack the surge capacity needed to respond to a catastrophic event such as pandemic influenza and will never be able to provide that capacity solely within their facilities. Another CDHS proposal, BCP PS-61 provides funding for local health departments to identify and develop alternate care sites such as closed hospitals, county fairgrounds, and school gymnasiums that will need to be converted to provide hospital care. However, PS-61 does not request funds to pay for medical equipment and supplies and staff for alternate care sites.

Staffing

Under a pandemic influenza scenario, a large number of additional healthcare workers will be needed to care for patients. Because influenza is a respiratory disease, there will be a particular need for respiratory therapists and nursing personnel trained in the care of patients with respiratory illness.

Supplies and Equipment

Antivirals: CHSCS asked how many courses of antivirals were available in hospitals. Statewide, hospitals reported 6,671 courses of oseltamivir (Tamiflu) and 361 zanamivir (Relenza) inhalers are currently available. The small amount present in California's hospitals is insufficient to treat all but a small fraction of healthcare workers.

Ventilators: Influenza is a respiratory illness. Under pandemic conditions, the number of patients needing ventilator support will be much higher than in a moderate event such as a local or regional earthquake, fire, flood, or bioterrorist attack. The CDC's model for pandemic influenza response planning indicates that California will need 34,028 ventilators to meet surge demand levels. The CHSCS indicates there are 10,677 surge ventilators available statewide, resulting in a gap of 23,351 ventilators.

Masks: Masks provide respiratory protection to healthcare workers. An N-95 mask is a disposable respirator mask that protects healthcare workers from transmission of infectious diseases via airborne particles. At the beginning of an influenza pandemic, it will be unknown whether the virus is transmitted by airborne particles or droplets. Thus, in order to ensure protection in the early phases of a pandemic, healthcare workers should use N-95 masks when caring for suspected or confirmed influenza patients. As the pandemic progresses, experts will evaluate the utility of and necessity of N-95 masks. N-95 masks must be stockpiled in advance of a pandemic, as once a pandemic occurs, the worldwide demand will vastly exceed supply. N-95 masks can be easily stockpiled as they require minimal storage space and have a long shelf life. A small percentage of healthcare workers will be unable to wear N-95 masks and will require powered air purifying respirators (PAPRs).

Hospitals report existing stockpiles as follows:

- N-95 Masks: 526,416
- PAPRs: 6,234

Assuming that approximately one-third of the approximately 500,000 healthcare workers in California have direct patient contact and require three N-95 mask changes per day, California hospitals would need 562,500 masks per day. Assuming N-95 masks are necessary during the first six months (180 days) of pandemic, California hospitals would need 101.3 million masks.

III. ANALYSIS AND RECOMMENDATIONS

A. HEALTHCARE SURGE FOR ALL EVENTS

Addressing Surge Capacity Standards and Guidelines Gaps

Mounting a surge response to a moderate or catastrophic event requires staffing, equipment and supplies, and a framework of standards and guidelines on how and when to implement those resources on a coordinated, integrated basis across facilities and jurisdictions.

1. CDHS would rapidly develop State standards and guidelines on the licensing flexibility, liability protection, reimbursement, standards of care, and other issues that may affect hospitals and local health departments during a moderate or catastrophic event response. The guidance will include hospital surge plan templates, and standardized training curricula and exercises for surge response.

CDHS, in consultation with a broad array of stakeholders including EMSA; the Office of Statewide Health Planning and Development; local health departments; hospital, medical, and clinic associations; professional licensing boards; and other experts, would work with an appropriately qualified entity to develop statewide standards and guidelines for providing medical care in emergency situations – be they of a moderate or catastrophic nature. These standards and guidelines will address areas of concern such as:

- regulatory flexibility for facilities and health professionals needed during an event and rapid resumption of current regulatory standards and levels of care;
- liability protections needed for altered standards of care and use of volunteer or paid staff with expanded scopes of practice or lacking regular hospital staff privileges;
- ways to increase staffing in emergencies;
- reimbursement issues for care givers;
- standards and guidelines for alternate care sites, including required staffing and equipment;
- standards for pre-hospital and hospital austere care;
- guidelines and templates for hospital surge capacity plans;
- standardized training curricula and exercises; and
- identification of regional boundaries for hospital surge planning.

Many of these areas involve difficult and complex issues that have been widely discussed in numerous forums but never brought to resolution. Left unresolved, the issues will be addressed haphazardly in an emergency, weakening the response. The State must make a significant investment of resources now to rapidly resolve these issues and develop standards and guidelines.

Recommendations:

CDHS proposes to contract with a consulting firm to direct and provide expert knowledge to a consultative process with CDHS and stakeholders to develop the standards and guidelines identified above. Due to the urgency of completing this task, CDHS is seeking exemption from the provisions of the Public Contract Code to allow procurement of this contractor via a sole source process.

Some of the standards and guidelines developed via this process may be incorporated into statute or regulations. Others may form the basis for emergency orders that CDHS would prepare in advance for use by the Governor during an event. Other standards and guidelines would be issued to all local health departments and hospitals for their use in planning for surge capacity. State leadership and investment are needed to provide standards and guidelines for local health departments and hospitals to ensure a statewide level of preparedness and response to surge.

The estimated one-time cost for this effort is \$5.0 million, and \$224,000 annually for one SSM III to manage the health care surge capacity program and one AGPA to work with the consultant and stakeholders on developing, implementing and maintaining the standards and guidelines.

B. HEALTHCARE SURGE FOR MODERATE EVENT (HRSA BENCHMARKS)

Based on review of data from the CHSCS, the following activities are recommended to strengthen the surge system and increase patient care capacity and capability for a moderate event.

Hospital Surge Planning

Most California hospitals are not prepared for a surge in patient care. Hospital emergency planning has focused on movement and evacuation of patients rather than an influx of patients. State licensing regulations and national accreditation standards are outdated and inconsistent with state and federal response systems. HRSA participating hospitals have accumulated communications equipment, decontamination systems, isolation capacity, personal protective equipment, small pharmaceutical caches for hospital staff, and surge supplies and equipment such as cots, generators, and blankets for increasing bed capacity, but do not have plans and preparations in place to coordinate a surge effort.

- Less than half of the 340 hospitals participating in HRSA report having documented full-scale surge plans
- Only 18.6% of hospital staff (91,635) have received any type of emergency response training such as ICS and SEMS/NIMS
- Hospital exercises have primarily focused on evacuation of patients from the facility

- Nearly 100 hospitals do not participate in HRSA surge planning

Events such as the terrorist attacks on 9/11, Hurricane Katrina, the Loma Prieta earthquake, floods in northern and central California, and wildfires in southern California, and the threat of pandemic influenza demonstrate the imperative for healthcare facilities and local health departments to work together to protect Californians. Local health departments currently receive CDC funds (and new state funds proposed in the Governor's Budget in BCP PS-61) for preparedness and response planning. However, not all healthcare facilities participate in HRSA-funded activities, and hospitals and local health departments need to engage further in coordinated, integrated communitywide and regional surge capacity planning.

As noted above, accredited hospitals must have emergency plans. However, emergency plans have not focused on a large influx of patients and potential concurrent decrease in the number of staff that would result during a public health emergency such as a bioterrorist event or an influenza pandemic. Operational surge plans must be in place in every California hospital and hospitals need support for developing those plans.

Currently, hospital participation in surge capacity planning is voluntary and not all hospitals participate in HRSA efforts. Most hospitals conduct few emergency exercises beyond evacuation drills. Some local health officials find it challenging to engage hospitals in local health department emergency planning activities.

Given the private nature of the hospital industry, state leadership and investment are needed to encourage hospitals to participate in surge capacity planning on both a facility and a communitywide basis. While hospital leaders understand their facility's importance as a resource to the community, hospitals lack resources to fully participate in training and planning exercises.

Recommendations:

CDHS recommends that local health departments be allocated funds to provide hospitals with minimal staff resources to develop and maintain hospital surge plans, including plans for surge staffing, infection control, equipment needs, systems for managing volunteers, training, and exercises. CDHS proposes channeling the funding for these hospital staff through the local health department because local health departments have the lead responsibility for ensuring surge capacity at the community level.

CDHS proposes funding one full-time equivalent (FTE) position for hospitals with 200 or more beds and one-half FTE for hospitals with 50-199 beds. For counties with multiple small hospitals (each fewer than 50 beds), CDHS proposes funding one FTE for one hospital that would plan for all of the small hospitals in the county. In counties with a single small hospital, CDHS proposes funding one-quarter FTE. Since preparedness is an ongoing need, CDHS proposes that these positions be permanent, General Fund positions. The estimated total annual cost for the addition of staff resources for all

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general acute care hospitals is \$29,000,000. CDHS proposes to start this funding January 1, 2007.

<i>Hospital Size (Licensed Beds)</i>	<i>Number of Hospitals</i>	<i>Number of Funded Positions</i>	<i>Cost of FTE</i>	<i>Total Annual Funding for Staff</i>
200+ beds	162	1 FTE	\$100,000	\$16,200,000
50-199 beds	216	.5 FTE	\$100,000	\$10,800,000
< 50 beds and sole small hospital in county	20	.25 FTE	\$100,000	\$500,000
County groups of hospitals with <50 beds	15	1FTE	\$100,000	\$1,500,000
Total Annual Cost				\$29,000,000

Using funding from this proposal, hospitals would be responsible for developing and maintaining documented hospital surge plans including:

- Planning for a large influx of patients in a short timeframe which could continue for a long period of time;
- Specifying triggers for actions such as canceling elective surgeries, early discharges, and redirection of patients;
- Developing procedures for recalling staff and analysis of other staffing options;
- Developing procedures for managing volunteer medical and non-medical staff;
- Ensuring ample supplies and equipment and processes for purchasing additional supplies during emergency situations;
- Defining roles and responsibilities during public health emergencies, including the role of the hospital in alternate care sites; and
- Developing training plans and schedules to ensure staff are ready to respond during a public health emergency.

In addition, hospitals would be responsible for ensuring hospital staff is trained on the facility surge plan, participating in regional exercises, and participating with the local health department in communitywide surge planning.

In determining the required resources for hospitals, CDHS considered three models for providing resources to hospitals: 1) adding contract staff at the state level, 2) adding staff at the operational area level designating a resource hospital in each county; and 3) providing resource to each individual hospital.

Although contract staff could be hired at the state level to aid hospitals in developing surge plans, hospital staff time would still be needed to customize the plans for individual hospital needs. Surge plans must also be indoctrinated into every day hospital business including staff training and drills and exercises. The addition of contract staff would not alleviate the need for additional hospital resources.

Second, CDHS considered designating a resource hospital in each county. Given the urgency for developing surge plans, a designated resource hospital would not be effective. Although the addition of staffing may increase surge planning at the designated hospital it would not ensure preparedness across all California hospitals.

Finally, CDHS considered the appropriate allocation of resources to hospitals of varying size. CDHS considered the number of licensed beds at each facility; 162 hospitals had 200 or more licensed beds, 216 hospitals had 50-199 licensed beds, and the remainder had fewer than 50 licensed beds. CDHS recommends one full-time position for hospitals with 200 or more beds and a half-time position for hospitals with 50-199 beds. Hospitals with fewer than 50 beds would be pooled together. For small hospitals located in counties with multiple small hospitals, CDHS proposes adding a full-time position to the County allowing the selection of one of the hospitals to house the position and take responsibility for planning for all of the hospitals. In counties where there is only one small hospital, the hospital would receive \$25,000 for a portion of a position to plan with other hospitals. Since preparedness is an ongoing need, CDHS proposes that these positions be permanent positions funded through the General Fund. Estimating a cost of \$100,000 for each full-time position and \$50,000 for each half-time position, CDHS calculates a total cost of 162 full-time positions for hospitals with 200 or more licensed beds (\$16,200,000), 216 half-time positions for hospitals with 50-199 licensed beds (\$10,800,000), 15 full-time positions for counties with multiple small hospitals (\$1,500,000), and 20 quarter-positions for those small hospitals residing in counties which contain only one small hospital (\$500,000). The estimated annual total cost for the addition of staff resources in all general acute care hospitals is \$29,000,000.

Availability of Surge Beds

Several factors contribute to the shortage of beds in some geographical areas, among them, a lack of training and expertise in surge planning in the hospitals as well as among the local HRSA entities; insufficient hospital staff resources for surge planning; a shortage of participating hospitals; and the absence of clear guidelines and surge planning tools and templates for hospital use. In addition, patient care surge capacity has focused primarily on hospitals as the source for building surge bed capacity.

Analysis of the CHSCS data showed that the size of a hospital, measured by the number of licensed beds, is not directly correlated to the number of surge beds reported. The correlation coefficient is .21 as measured in 3 hours and .26 in 24 hours, indicating a minor relationship between the two variables. Hospitals reported a broad range in the percentage of current capacity that they could surge – from 0% to 178%.

Recommendations

In order to maximize hospital surge capacity at the local level, three activities are needed:

- Technical assistance and training provided to hospitals in counties that have not met their individual surge targets to increase individual hospital surge numbers. Technical assistance will be provided by the six Regional HRSA Coordinators currently funded through the HRSA NBHPP.
- The addition of staff at each hospital to focus on emergency planning including development and exercising of surge plans and protocols. See proposal under “Hospital Surge Planning” above.
- CDHS has proposed Trailer Bill language to require hospitals to participate in surge-related planning with local health departments.

Through these activities, CDHS aims to increase surge bed capacity by 2,000 beds within the next twelve months.

Update Hospital Licensing Requirements During Emergencies

CDHS will review and update the regulations governing acute care hospitals and other types of healthcare facilities during major emergencies or disasters, as well as update hospital infection control regulations. The existing emergency preparedness, disaster response and infection control regulations did not envision the threats presented by bioterrorism and pandemic influenza. CDHS has proposed Budget Bill language to enable the department to promulgate these regulations on an emergency basis.

Recommendations:

CDHS proposes 3.5 two-year limited term positions to update these regulations (one Health Facilities Evaluator Nurse or HFEN, one Staff Counsel, and one Nurse Consultant III for the Licensing and Certification Program as well as .5 Nurse Consultant III position for the Office of Regulations). This process would include working closely with stakeholders to identify necessary changes to these regulations. The positions would be funded through the Licensing and Certification Program Special Fund, at a cost of \$424,000.

As part of the regulatory process, CDHS will identify any additional resources needed as well as the process for monitoring on-going compliance with these requirements.

Purchase Mobile Field Hospitals

A moderate event such as a regional earthquake, fire, flood, or bioterrorist attack could kill, injure, or sicken tens or hundreds of thousands of Californians. Such an event

would place unprecedented strain on an already stressed healthcare delivery system. California must be ready to supplement the capacity of overburdened or damaged facilities. Deployable mobile field hospitals (MFH) would serve as a State resource to supplement hospital resources in an event that exceeds or damages those resources.

EMSA proposes purchasing two MFHs that are self-contained with heating/ventilating and cooling systems, medical gases, and full generator power rendering the units operable in all climactic conditions. The MFHs would also be supplied with all requisite medical equipment and medical/stock supplies. EMSA would pre-position one MFH in Northern California and one in Southern California and could deploy them within the first few days of an event, long before military hospitals or other major federal resources would be available.

Each MFH will have a bed capacity of 200 and modules for:

- Patient holding areas, wards, nursing stations, central medical service areas, and administration,
- Advanced trauma life support, surgical operating rooms, intensive care, and isolation,
- Ancillary medical services including laboratory, x-ray, and pharmacy services.

During an event, EMSA would set up and run the MFHs using a combination of state personnel, contracted logistic support staff, and organized disaster medical volunteers. EMSA would develop training programs to prepare staff to provide medical services within the facilities. EMSA would fully coordinate the MFH program with the Governor's Office of Emergency Services, California National Guard, and CDHS.

Recommendations

EMSA will need \$12,316,000 to purchase and maintain two MFHs and hire two Health Program Specialist I positions and one Health Program Manager I position to support the MFHs and provide training, exercises, and drills for their deployment.

The purchase price of each MFH is \$3,335,000 (total cost for 2 MFH is \$6,670,000). Related one-time costs include the purchase of 1 forklift per MFH (2 @ \$20,000 ea = \$40,000), 4 flat bed trucks per MFH (8 @ \$50,000 = \$400,000), ventilators (assuming 60% of patients will require ventilators, \$10,000 x 400 beds x 60% + 7.75% tax + 3% freight/shipping + 5 year maintenance agreement @ \$2,800 = \$3,265,000), HEPA filters (\$35,000 per filter x 10 filters X 2 MFHs = \$700,000). Ongoing costs include maintenance (\$30,000 per year), warehouse rent (\$300,000 per year), training exercises (\$100,000 per year), replacement of expired pharmaceuticals (\$16,000 per year). Each MFH requires a 24-hour On-Call Response Team (\$200,000 per team x 2 MFH = \$400,000).

Patient Care Capacity at the U.S. - Mexico Border

In reviewing surge bed capacity, of particular concern are Imperial and San Diego Counties which will face a surge in patients from across the Mexican border in addition to its own population. For example, based on an estimated border population of 1,000,000 and applying the same HRSA standard of 1 bed per 2000 population, an additional 500 surge beds will be needed in San Diego County beyond the number assumed to be needed for San Diego residents.

Recommendations

- Store one of the mobile field hospitals within Region VI which includes San Diego and Imperial Counties.
- CDHS will establish a Border Surge Care Taskforce to broaden existing public health emergency preparedness discussions to include surge planning. Taskforce members will include representatives from CDHS including the Office of Binational Border Health, EMSA, the Association of State and Territorial Health Officers, the Mexican Consulate, Imperial and San Diego Health Departments, and Baja California and Mexico Health Departments. Using existing HRSA funds, the taskforce would be staffed by a consultant who would develop a border surge plan.

Ongoing Surge Capacity Data Collection

Planning and response for patient care surge capacity are both dependent on information about the location and availability of resources. The CHSCS has provided significant information about resources that currently exist and where they are located. In order to maintain this information and meet regular HRSA reporting requirements, CDHS will need to ensure that a system is in place to collect data on an ongoing basis. Rather than establishing a new system, CDHS has explored other areas where hospital data is reported. For example, OSHPD's current hospital data collection is already geared to status reporting, policy-making and research. OSHPD has two primary electronic data collection systems; the Medical Information Reporting for California (MIRCal) collecting patient level administrative data, and the Automated Licensing Information and Report Tracking System (ALIRTS) collecting facility level utilization data. OSHPD's data systems receive information from hospitals, emergency departments, long-term care facilities and other health facilities.

Recommendation

CDHS proposes a taskforce composed of state agencies, CHA, hospitals, unions, local health departments and other stakeholders headed by a contractor to examine the ongoing data collection needs, existing hospital data collection resources, and the ability of existing data systems to incorporate the collection of hospital preparedness data in order to determine the best solution for data collection from both the state and hospital

perspectives. The task force and completion of an FSR would be staffed by a consultant, funded with existing HRSA funds.

Hospital Available Bed Reporting

A statewide disaster medical information management system is necessary for hospital and pre-hospital resource and response status during an emergency. Each level of SEMS (local EMSA's, Regional Disaster Medical Health Coordinator/Specialists and the JEOC) needs simultaneous access to real time data and display. This goal will address the need for a seamless communication system to assist in joint decision making.

In 2002, EMSA provided HRSA funds to local EMSAs to purchase ReddiNet, EMSystems or DataTek 911 software for communications between hospitals and LEMSAs, if the county had not previously implemented a system using one of these recognized vendors.

Recommendation

Establish a task force to explore the development of a standard data set for reporting available beds and to determine how best to develop a standard reporting tool or interface that could tie together information across the state into a single information management system. This taskforce would be funded and staffed with existing HRSA grant funds allocated to EMSA.

Staffing

Providing sufficient qualified medical, nursing, and ancillary personnel is likely the greatest challenge in ensuring surge capacity. During an event of any scope, surge beds need to be supported by staff, many of whom may have been affected by the event and rendered unable to respond. CDHS and EMSA will continue to identify approaches to expand staffing capacity, using existing HRSA funds.

Pharmaceuticals

The drugs traditionally used for prophylaxis against bioterrorist (BT) agents are commonly prescribed oral antibiotics, including amoxicillin, doxycycline, ciprofloxacin, and levofloxacin. These antibiotics have been purchased with HRSA funds and are stored at participating hospitals and local health departments.

While it is acknowledged that current HRSA funding is inadequate for purchasing sufficient oral antibiotics to provide prophylaxis for all hospital staff and their families, other factors should be considered. First, these drugs are available within 3 days through deployment of the federal Strategic National Stockpile.(SNS.) Second, it is very unlikely the entire state or even a very large geographical portion of the state would be affected by a BT event. Third, individual hospitals have reported difficulty in storing and rotating cached drugs through their inventories, causing expired drugs to be discarded.

Recommendations:

CDHS plans to establish a regional system for storing pharmaceuticals, based on the assumption that within 3 days SNS assets would have arrived and be available for hospital staff in addition to mass distribution to the public. The following actions are recommended:

1. Pursue the current HRSA funded plan to develop regional caches, combining individual hospital caches into regional caches that could be deployed to affected area hospitals for dispensing to staff and their families. In this manner, a reasonable quantity of drugs could be purchased and stored for a locally focused need which is a more likely BT scenario. Such a locally focused need may involve multiple cities or even multiple adjacent counties (as in the case of a very large aerosolized dispersal of anthrax spores, commonly considered worse case scenario for a BT attack), but would not likely affect the entire state. Flexibility would still be allowed if individual hospitals wish to store facility-based caches.
2. In compliance with HRSA standards, maximize the use of available funds to purchase oral antibiotics for prophylactic use. In determining which drugs to include in HRSA regional caches, consideration is given to drugs which are included in the SNS and cost factors (e.g., generic compounds are more affordable than brand name patent drugs). Cipro is now off patent and available from multiple manufacturers under its generic name ciprofloxacin and is less expensive than Levaquin, the current patent formulation of levofloxacin. Although ciprofloxacin and levofloxacin are therapeutically equivalent for prophylaxis against anthrax, plague and tularemia, ciprofloxacin should be considered the oral fluoroquinolone antibiotic of choice for HRSA regional caches due to its generic cost advantages

Small amounts of rifampin will be included in regional HRSA caches. Rifampin is used in combination with doxycycline for prophylaxis against brucellosis. Since brucellosis is not considered a major BT threat compared to anthrax, plague, or tularemia, smaller quantities will be purchased.

The following pharmaceuticals are approved for inclusion in HRSA caches:

- amoxicillin
- ciprofloxacin
- doxycycline
- trimethoprim/sulfamethoxazole
- rifampin (small quantity in regional caches only)

Recommendation

In HRSA Year 4, approximately \$3 million is allocated for the purchase of pharmaceutical caches. Local planning groups have the option to purchase individual

pharmaceuticals (see above list) or purchase a standard cache of pharmaceuticals. The drugs included in the standard cache are consistent with the SNS (doxycycline, ciprofloxacin, and amoxicillin) and target the main threats of anthrax, plague, and tularemia. Each cache treats 74 people and costs approximately \$760; \$3 million will provide 3,947 caches which will cover 292,078 persons with 3-day courses. Twenty percent of each cache will be available for pediatric dosing (reflecting the percentage of the population 0-13 years of age). An additional \$3 million will be allocated in HRSA Year 5, for an additional purchase of 292,078 courses, increasing the number of 3-day courses by 584,156 over the next eighteen months.

Education and Training

Education, training and exercises are essential to the ability to respond during a public health emergency. Data from the CHSCS indicate a lack of education and training as well as a limited number and scope of exercises.

Hospitals have indicated that one barrier to training is the reimbursement policy under HRSA. Current state policies for HRSA require hospitals to fund 50% of staff time spent in training. Hospitals argue that this is inadequate.

Recommendation

CDHS has examined options for increasing HRSA reimbursement for staff time spent in training. Options explored include delivering training on-site to cut down on time spent traveling, increasing the training reimbursement based on local priorities, and requiring participation in hospital based, regional, and statewide exercises either as a condition of funding under the HRSA grant or through statutory or regulatory change. The stakeholder group addressing standards and guidance, supported by the consultant, will develop standardized training curricula and methodology.

Exercises

Exercises are essential for measuring the ability to respond during a public health emergency. CDHS and EMSA will continue to coordinate statewide and regional exercises, and the HRSA Regional Coordinators will develop hospital based scenarios and provide technical expertise in conducting exercises.

Recommendation

The stakeholder group addressing standards and guidance, supported by the consultant, will develop standardized exercise scenarios and templates.

C. HEALTHCARE SURGE FOR CATASTROPHIC - PANDEMIC INFLUENZA

The advance purchase of supplies and equipment is vital for pandemic influenza preparedness. Due to the expected nationwide impact and limited ability to purchase

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supplies and pharmaceuticals on a just-in-time basis, it is prudent to stockpile resources as close as possible to hospitals and alternate care sites. Local health departments are encouraged to work within their OES mutual aid regions to establish regional stockpiles.

1. Purchase 3.7 million courses of antiviral medications through the federal 25% discount program.

CDHS recommends that the State commit to purchasing 3,723,339 subsidized courses of antivirals using General Funds. CDHS is prohibited from using federal bioterrorism funds to purchase antivirals.

	Number of Courses		Cost/Course	Total Cost
Previously Purchased Tamiflu	616		\$61.28	\$37,748
SB 409 cache of Tamiflu (obtained 25% federal subsidy)	31,866		\$14.43	\$459,830
2006 General Fund allocation \$53,348,000 + \$1,300,000 = \$54,648,000	Tamiflu with 25% subsidy	3,322,326	\$14.43	\$47,941,164
	Relenza with 25% subsidy	369,147	\$16.29	\$6,013,405
	Tamiflu without 25% subsidy	32,024	\$19.24	\$616,142
	Relenza without 25% subsidy	3,558	\$21.72	\$77,280
Totals	3,759,537			

NOTE: Federal subsidy of 25% is available for 3,723,339 courses only of which LA County will receive 1,036,440 courses (932,796 Tamiflu & 103,644 Relenza)

Total Tamiflu Courses = 3,386,832 (LA to receive 932,796)
 Total Relenza Courses = 372,705 (LA to receive 103,644)
 Total Antiviral Courses = 3,759,537

Of the antivirals to be purchased, 90% will be Tamiflu and 10% will be Relenza. These percentages are based on the recommendation of a group of national experts that CDHS convened to evaluate options. The federal government is unable to specify when the product would be available or when payment will be due.

CDHS will use existing federal bioterrorism preparedness funds to rent warehouse space in a single location to store the antivirals. A single storage site will provide CDHS with the greatest control and flexibility in distributing the antivirals to where they are needed during a pandemic.

2. Purchase ventilators.

Under pandemic conditions, the number of patients needing ventilator support will far outstrip capacity.

- Need: 34,028 ventilators
- Currently Available: 10,677 surge ventilators
- Gap: 23,351 additional ventilators needed

Although pandemic modeling indicates the need for 34,028 ventilators (see Appendix D), currently available staff and facilities could not support their operation.

Recommendation:

CDHS proposes to double the number of ventilators now available through the purchase of 10,677 ventilators at a cost of \$10,000 per ventilator for a total cost with tax, shipping, and maintenance of \$106,770.

The vendor will store, rotate, and maintain the ventilators (“vendor-management”) at sites in Northern and Southern California.

3. Purchase supplies for alternate care sites.

CDHS proposes to help local health departments develop communitywide and regional pandemic-level surge capacity by funding purchase of supplies for alternate care sites.

Hospitals are integral to efforts to increase surge capacity, however hospitals cannot meet pandemic influenza surge targets alone. Local health departments have lead responsibility for working with hospitals and healthcare systems to develop the communitywide and regional surge capacity needed for a pandemic. This responsibility includes identifying alternate care sites and determining the use of these sites. Closed hospitals, military installations, clinics, churches, schools, hotels, or other facilities may all serve as appropriate sites.

The supplies needed to operate alternate care sites depend on the types of beds to be set up at each site. For general medical-surgical beds, a cache of supplies is estimated to average \$400 per patient. For intensive care beds, the cost of supplies rises to \$4,000 per patient. There would be additional costs for staffing the sites.

Supplies	Quantity	Unit Cost	Total Supply Cost	Sales Tax		Shipping Rate	Cost	Total Cost
				Rate	Cost			
ICU Beds	36,423	\$4,000	\$145,692,000	7.75%	\$11,291,130	3%	\$4,370,760	\$161,353,890
Med-Surg Beds	4,969	\$400	\$1,987,600	7.75%	\$154,039	3%	\$59,628	\$2,201,267
Warehouse Storage, 3,000 sq.ft. @ \$1.00 per region per month	6 regions	\$36,000						\$216,000
Staffing								\$596,000
Total			\$147,679,600		\$11,445,169		\$4,430,388	\$164,367,157

Additionally, 3,000 square feet of regional warehouse storage will be needed at a cost of \$1.00 per square foot per region per month, for a total storage cost of \$216,000 per year. CDHS proposes the addition of a half-time position in each mutual aid region to manage storage of supplies and equipment. At an estimated cost of \$50,000 for each of the six OES mutual aid regions, the total annual cost is \$300,000. CDHS proposes to hire these staff in August 2006, for a cost of \$275,000. CDHS requests one SSM II Manager to direct the activities of the Surge Unit and two AGPAs for purchasing and contracts. Total cost is \$164,367,000.

4. Purchase N-95 Masks

Masks provide respiratory protection to healthcare workers. An N-95 mask is a disposable respirator mask that protects healthcare workers from transmission of infectious diseases via airborne particles. At the beginning of an influenza pandemic, it will be unknown whether the virus is transmitted by airborne particles or droplets. Thus, in order to ensure protection in the early phases of a pandemic, healthcare workers should use N-95 masks when caring for suspected or confirmed influenza patients. As the pandemic progresses, experts will evaluate the utility of and necessity of N-95 masks. N-95 masks must be stockpiled in advance of a pandemic, as once a pandemic occurs, the worldwide demand will vastly exceed supply. N-95 masks can be easily stockpiled as they require minimal storage space and have a long shelf life. A small percentage of healthcare workers will be unable to wear N-95 masks and will require powered air purifying respirators (PAPRs).

Hospitals report existing stockpiles as follows:

- N-95 Masks: 526,416
- PAPRs: 6,234

Assuming that 37.5 percent of the reported 500,000 healthcare workers have direct patient contact and assuming 3 mask changes per day, 562,500 masks will be required on a daily basis. Assuming the stockpile would be needed for the first 6 months (180

days), 101,250,000 masks would be needed at \$0.45 per mask (\$45,562,500), sales tax at 7.75 % (\$3,531,094), and shipping at 3 % (\$1,366,875), for a total of \$50,461,000.

IV. CONCLUSION

The healthcare system in California is better prepared today than in the past to deal with the impact of an emergency. Hospitals have become more aware of surge needs, convened with local partners to begin surge planning, purchased surge supplies and equipment, developed strategies for obtaining additional surge beds, and begun training and exercises. Many of the HRSA benchmarks have been met, but there is still much work to be done. The spectre of pandemic influenza creates further requirements for surge planning, particularly since nationwide impact would reduce the likelihood of outside aid. In order to ensure a coordinated response effort, hospitals must not only have documented and exercised surge plans, but they must also be integrated within the context of a larger community. Both hospitals and communities must continue to plan for additional surge beds, staffing, and supplies and equipment, and ensure that these resources will be effectively utilized when needed.